



Data analysis

August 2016/19

Higher Education – Business and Community Interaction survey

2014-15

This report analyses the results of the Higher Education – Business and Community Interaction survey for UK higher education institutions, referring to the academic year 2014-15.

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Higher Education – Business and Community Interaction Survey 2014-15

To	Heads of UK higher education institutions
Of interest to those responsible for	Knowledge exchange; Innovation; enterprise and entrepreneurship; Interactions between higher education and business, public and third sectors; Contract and collaborative research; Continuing professional development; Public engagement; Strategic planning; Economic development
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Executive summary

Purpose

1. The Higher Education – Business and Community Interaction (HE-BCI) survey is in its 15th year and is an essential source of information on knowledge exchange (KE) in the UK. It focuses on specific interactions with external partners, such as contract and collaborative research, consultancy, continuing professional development and intellectual property, rather than attempting to assess the entire contribution of higher education institutions (HEIs) throughout their teaching and research activities.
2. The exchange of knowledge described here takes place between higher education institutions and the wider world of business and the community. All 161 publicly funded UK HEIs provided data for this report¹.
3. Data reported in this survey provides valuable intelligence for higher education senior managers, KE practitioners and policymakers. The report also provides an in-depth commentary on the extent of, and trends in, KE activity in UK HEIs. Overall, patterns are similar in each of the four constituent nations, although some data is displayed at the national level in the main report where recommended by the Stakeholders Group (see paragraph 19).
4. This report builds on data published in previous HE-BCI survey reports, the most recent of which, 'Higher Education – Business and Community Interaction Survey: 2013-14' (HEFCE 2015/13), was published in July 2015 and analysed 2013-14 data².
5. The data is collected by the Higher Education Statistics Agency (HESA). HEIs provided data for activity occurring during the academic year 2014-15. Data on strategy

¹ Data from the University of Buckingham and University Campus Suffolk is excluded from this report as these institutions are not publicly funded HEIs. This year, data from Plymouth College of Art and the National Film and Television School has been included for the first time.

² Available at www.hefce.ac.uk/pubs/year/2015/201513/.

and infrastructure, being neither numerical nor financial, relates to the end of the academic year (July 2015). The HE-BCI survey covers a range of activities from commercialisation of new knowledge, through delivery of professional training, consultancy and services, to activities intended to have direct social benefits. 'Business' in this context may refer to private, public, and third-sector partners of all sizes, with which HEIs interact in a broad range of ways³. 'Community' in this context means society as a whole outside HEIs, including all social, community and cultural organisations, individuals, and the public, both national and international.

Key points

6. Data collected for the academic year 2014-15 shows a continuing increase in the exchange of knowledge between UK HEIs and the public, private, and third sectors. The main indicators are summarised in Table 1. Annex A contains a summary of the full dataset for the UK and separate subsets for England, Scotland, Wales, and Northern Ireland.

Table 1: Main indicators (£000s cash terms)

£000s (cash terms)	2013-14	2014-15	Change	% Change
1a Collaborative research	1,143,804	1,257,033	113,229	9.9%
1b Contract research				
Total value with SMEs (£000s)	45,120	47,985	2,865	6.3%
Total value with large businesses (£000s)	418,202	435,257	17,055	4.1%
Total value with public and third-sector organisations (£000s)	729,084	726,539	-2,545	-0.3%
Total value of contracts (£000s)	1,192,406	1,209,781	17,375	1.5%
2a Consultancy				
Total value with SMEs (£000s)	74,272	73,686	-586	-0.8%
Total value with large businesses (£000s)	109,166	109,541	375	0.3%
Total value with public and third-sector organisations (£000s)	257,990	259,202	1,212	0.5%
Total income (£000s)	441,428	442,429	1,001	0.2%
2b Facilities and equipment related services				
Total value with SMEs (£000s)	51,490	59,134	7,644	14.8%
Total value with large businesses (£000s)	47,946	61,862	13,916	29.0%
Total value with public and third-sector organisations (£000s)	63,490	70,484	6,994	11.0%
Total income (£000s)	162,926	191,480	28,554	17.5%
2c CPD				
CPD for SMEs (£000s)	19,707	22,249	2,542	12.9%
CPD for large businesses (£000s)	130,825	136,873	6,048	4.6%

³ The 'third sector' refers to voluntary and community groups, social enterprises, charities, co-operatives and mutuals.

CPD for other public and third-sector organisations (£000s)	275,179	284,033	8,854	3.2%
CE and CPD for individuals (£000s)	252,708	271,761	19,053	7.5%
Total revenue (£000s)	678,419	714,916	36,497	5.4%
3a Regeneration and development programmes	180,606	204,558	23,952	13.3%
4c Intellectual property income				
SMEs	10,466	13,751	3,285	31.4%
Large Businesses	62,786	75,771	12,985	20.7%
Public and third sector organisations	8,806	13,109	4,303	48.9%
Sub-total (£000s)	82,058	102,631	20,573	25.1%
Sale of shares in spin-offs (£000s)*	49,059	52,770	3,711	7.6%
Total revenues (£000s)	131,117	155,401	24,284	18.5%
Grand Total	3,930,706	4,175,598	244,892	6.2%

* Denotes data not disaggregated by partner.

Note: 'SMEs' = 'small and medium-sized enterprises'; 'CPD' = 'continuing professional development'; 'CE' = 'continuing education'.

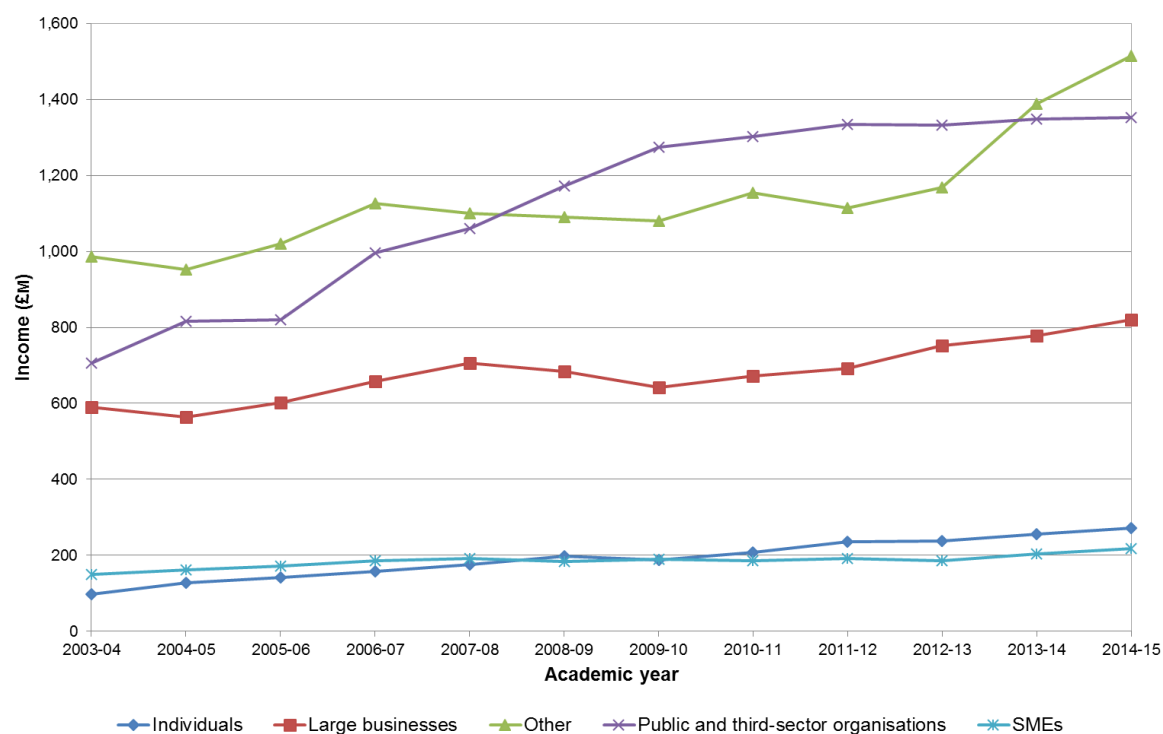
7. At a time of growth in the economy following a prolonged period of economic difficulty, growth in knowledge exchange income and activity provides an excellent case for continued public investment in higher education and specifically in knowledge exchange funding streams. Annual gross domestic product (GDP) growth for the UK in 2015 was estimated to be 2.2 per cent⁴. At 6.2 per cent, HE-BCI growth remained greater than overall UK GDP growth of approximately 2.2 per cent.

Investment in knowledge exchange by partner

8. Total KE investment across all activities from large businesses increased in cash (nominal) terms by 6.6 per cent, from £769 million in the previous year to £819 million, while small and medium-sized enterprises (SMEs) increased their overall spending by 7.8 per cent, from £201 million to £217 million. This is a smaller increase than last year, but continues the recovery from 2012-13. Income to HEIs from the public and third sectors increased by 1.4 per cent from £1,335 million to £1,353 million in 2014-15. Figure 1 shows how income from different types of partners has changed over time.

⁴ Second Estimate of GDP, Q4 October to December 2015, www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/secondestimateofgdp/quarter4octtodec2015#headline-gdp-components-and-gdp-per-head.

Figure 1: Total income by partner type, 2003-04 to 2014-15 (real terms 2015 prices)

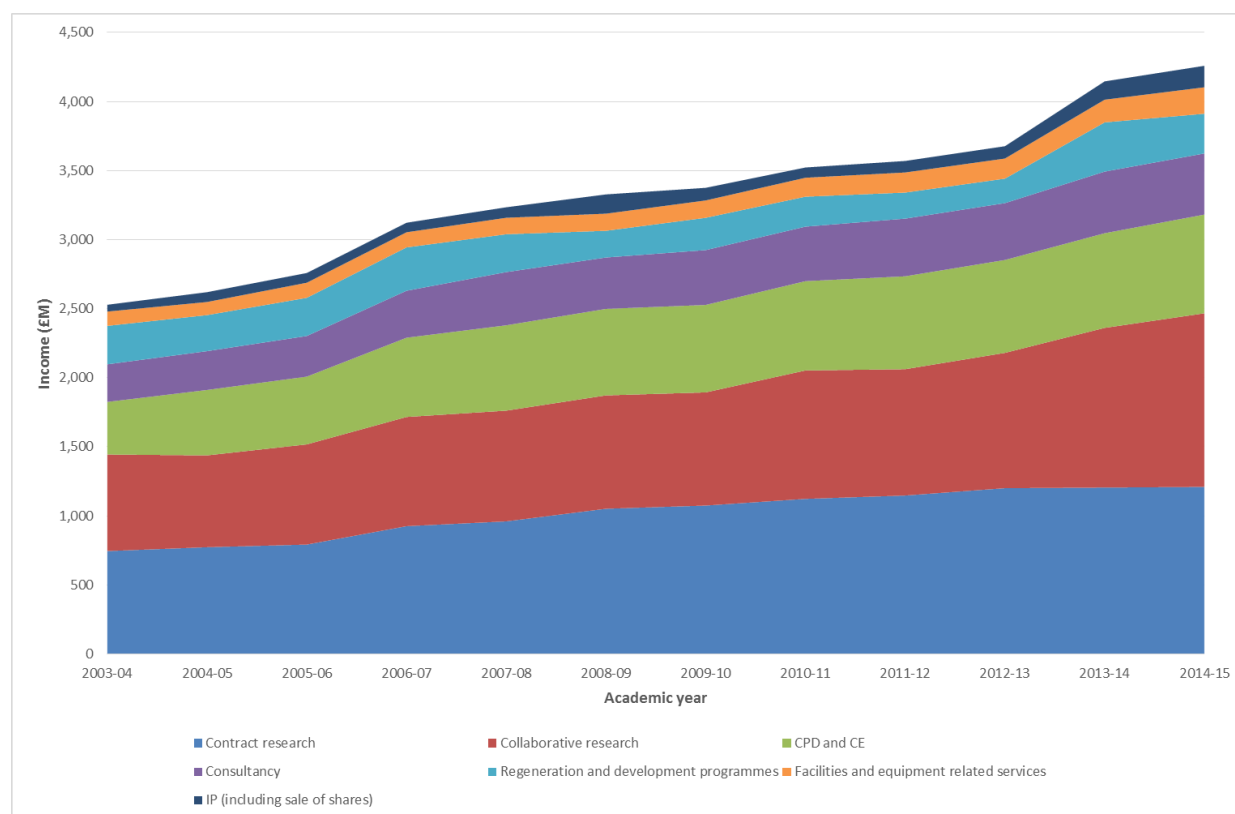


Source: HE-BCI Part B Tables 1, 2, 3 and 4c. Note: 'Other' refers to indicators which are not collected by partner type due to consideration of burden – see paragraph 30.

Collaborative research

9. Total income from collaborative research increased by 9.9 per cent during 2014-15, from £1,144 million to £1,257 million. Improvements in data recording during a stable funding environment may have contributed to this growth. Figure 2 shows selected income streams from 2003-04 to 2014-15.

Figure 2: Selected HE-BCI income streams, 2003-04 to 2014-15 (real terms)



Note: 'CPD' = 'continuing professional development'; 'CE' = 'continuing education'; 'IP' = 'intellectual property'. Source: HE-BCI Part B Tables 1, 2, 3 and 4c.

Contract research

10. Contract research income increased by 1.5 per cent, from £1,192 million to £1,210 million. Large businesses and SMEs increased their investment in contract research by 4.1 per cent and 6.3 per cent respectively, representing an increase in income of nearly £20 million in total, which is less than the equivalent increase recorded last year. Income from non-commercial partners saw a small fall of 0.3 per cent, reaching £727 million in 2014-15. Figure 3 shows income by activity and partner in 2014-15.

Consultancy

11. Income from consultancy saw a small increase from £441 million to £442 million in 2014-15; work for large businesses saw an increase of 0.3 per cent while SMEs decreased by 0.8 per cent. Consultancy spending from the public and third-sector partners increased by 0.5 per cent and still accounts for the majority of activity at £259 million (whereas SMEs and large businesses spent around £74 million and £110 million respectively in 2014-15).

Figure 3a: SME income by activity, 2003-04 to 2014-15

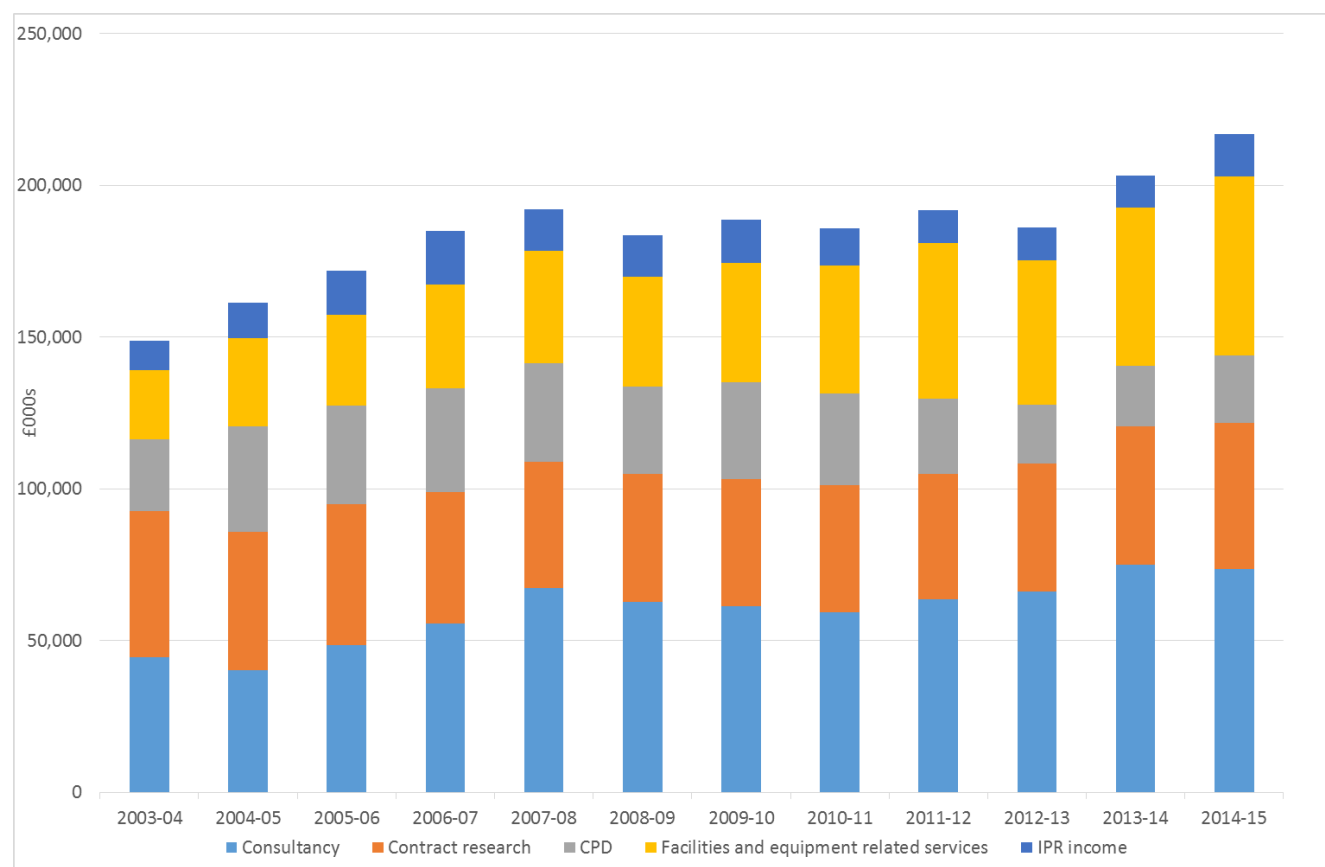


Figure 3b: Large business income by activity, 2003-04 to 2014-15

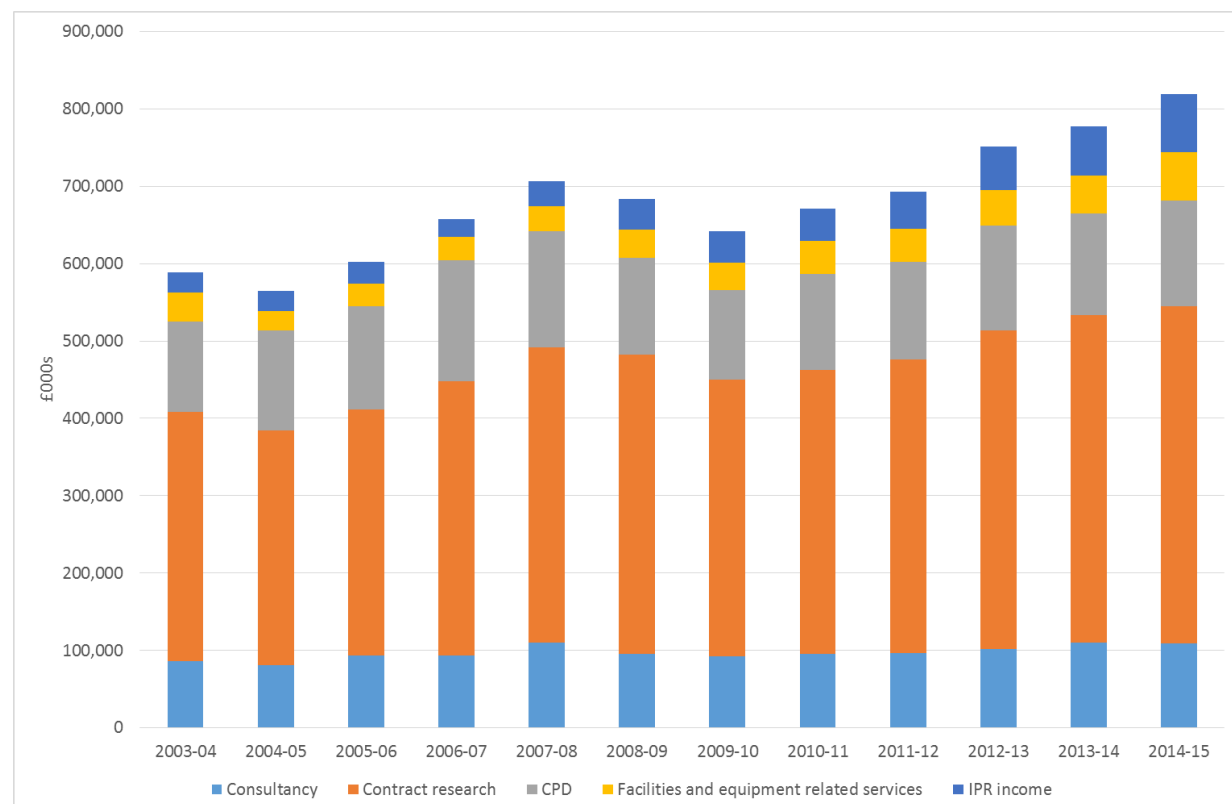


Figure 3c: Public and non-commercial income by activity, 2003-04 to 2014-15

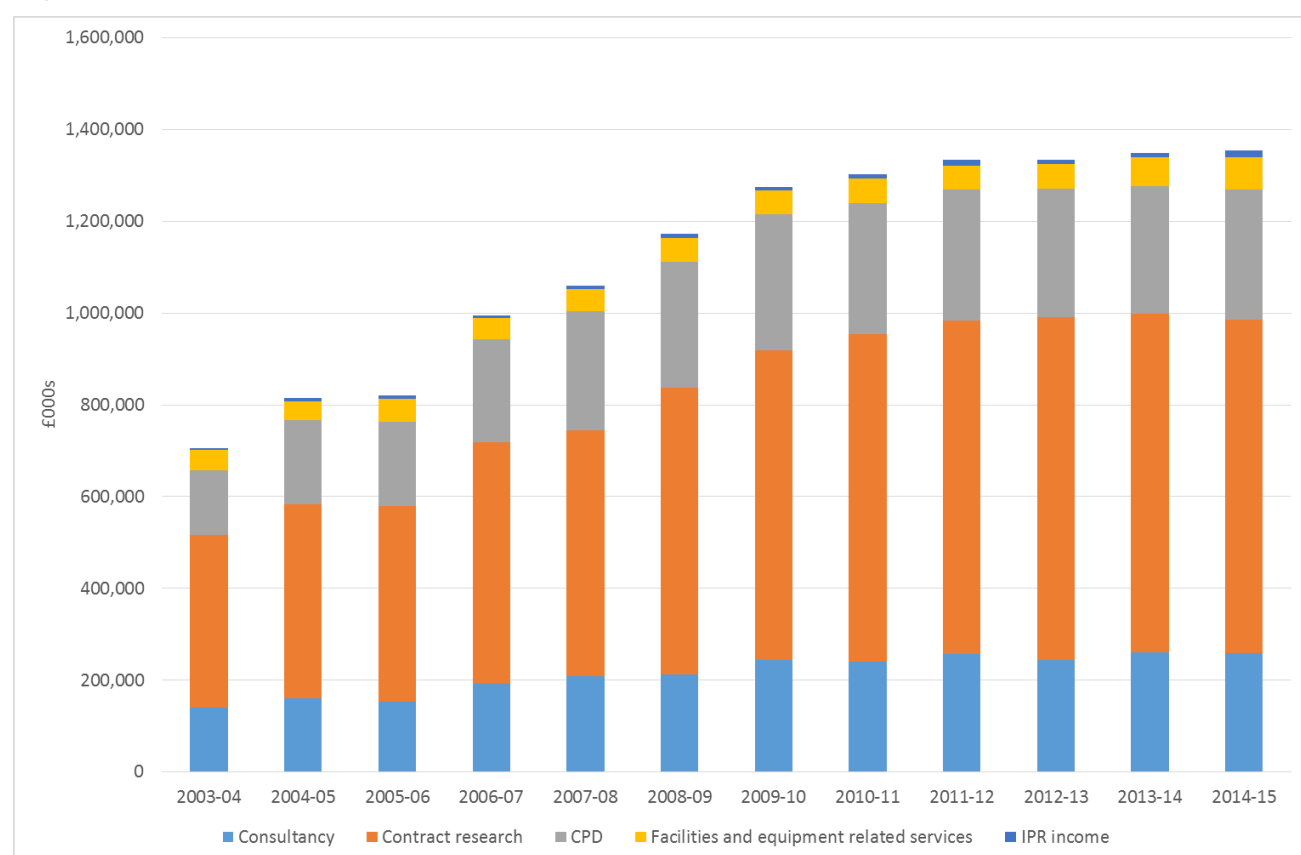
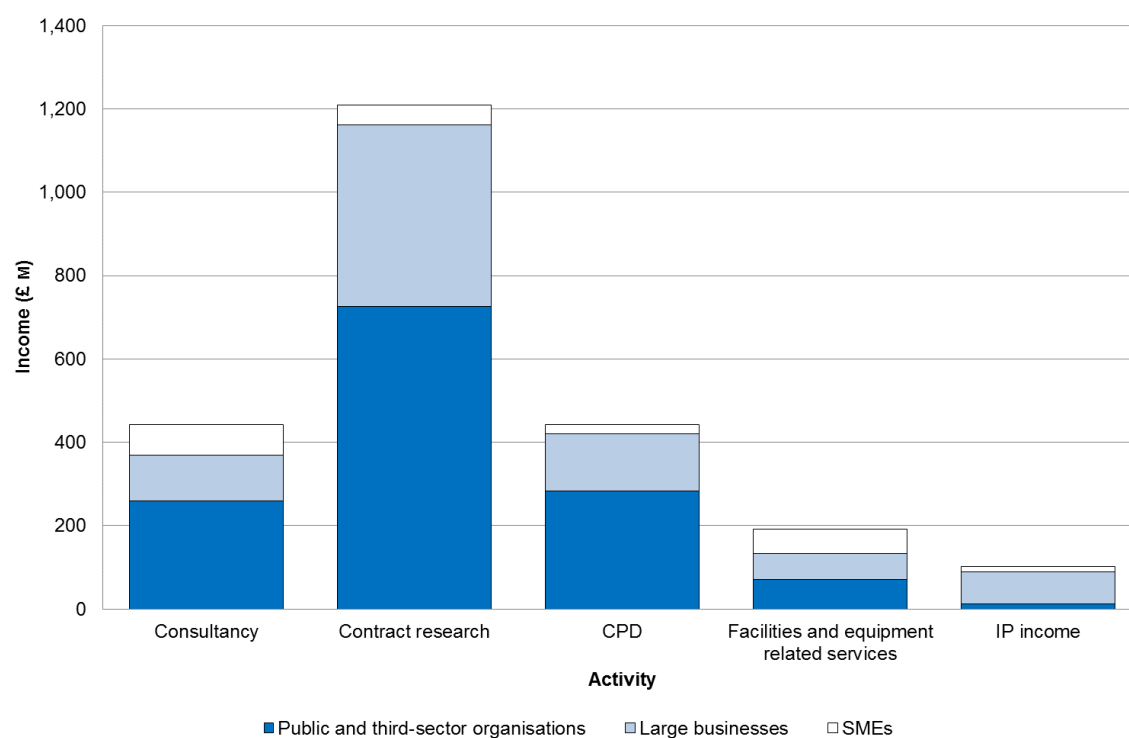


Figure 3d: Income by partners 2014-15



Note: 'CPD' = 'continuing professional development'; 'IPR' = 'intellectual property rights'.

Source: HE-BCI Part B Tables 1, 2 and 4c.

Facilities and equipment

12. Income from use of facilities and equipment (for example, prototyping equipment or digital media suites) rose by 17.5 per cent overall to £191 million. Income from large business accounted for the majority of this increase, with a rise of 29 per cent from £48 million to £62 million; this figure does not include an amount erroneously reported by an institution and published in the HESA data release in April 2016. Public and third-sector organisations saw a rise of 11.0 per cent, from £63 million to £70 million. SMEs saw growth in income of 14.8 per cent, from £51 million to £59 million, although the number of SMEs using these services reduced by 15.3 per cent from 17,037 to 14,433.

Intellectual property and enterprise

13. HE-BCI identifies income from licenses and the sale of spin-off companies as intellectual property income ('IP income'), although it is understood that almost all activity (collaborative research, continuing professional development and so forth) stems from the intellectual assets of HEIs. Licensing and spin-offs are perhaps better described as income from formal intellectual property rights. There has been an increase of 18.5 per cent in IP income, from £131 million to £155 million in 2014-15, with software and non-software licenses rising in value from £82 million to £103 million, an increase of 25.1 per cent.

Social, community and cultural activities

14. Attendance at public events has rebounded from last year, with a rise in attendee numbers of 47.3 per cent at free events and 14.5 per cent at chargeable events. The increase in free event attendance is largely attributable to an increase in the 'other' category of 187 million.

Regeneration

15. Income from regeneration programmes continued to increase in 2014-15. There was an increase in each indicator, with the exception of European Structural Fund income which saw a decline of 43.7 per cent, falling from £21 million to £12 million. The overall increase in regeneration income to UK HEIs was 13.3 per cent, from £181 million to £205 million.

16. Data on capital income has been collated as part of the HE-BCI return for the last couple of years. A summary of this data will be included in future annual reports.

Continuing professional development

17. Income from continuing professional development and continuing education activity rose from £678 million to £715 million in 2014-15, an increase of 5.4 per cent. The biggest growth in value again came from individuals (who may include sole traders as well as those studying for personal interest), who increased their collective spending by 7.5 per cent, from £253 million to £272 million; this figure does not include a sum corrected after the HESA release of data in April 2016. SMEs increased their spending by 12.9 per cent, and public and third-sector partners had an increase in spending on continuing professional development of 3.2 per cent. Income from large businesses rebounded after the previous year's fall, with an increase of 4.6 per cent.

Action required

18. This report is for information. No action is required.

Background and context

19. The aims of the annual Higher Education – Business and Community Interaction (HE-BCI) survey are:

- to provide data on the continuing development of interaction between higher education institutions (HEIs) and business and the wider community
- to provide reliable and relevant information to support the continued public funding of knowledge exchange (KE) activity in the UK
- to give HEIs good benchmarking and management information
- to develop a source of indicators at the level of the individual HEI, some of which can be used to inform funding bodies' allocations of continued funding
- to gain a UK-wide perspective in knowledge exchange and to highlight any significant differences across the four UK nations.

20. HE-BCI data for academic year 2014-15 was collected and validated by the Higher Education Statistics Agency (HESA) on behalf of all UK HEIs and the national funding bodies. The overall process, including this report, is overseen by the HE-BCI Stakeholders Group which includes:

- the UK higher education (HE) funding bodies
- the devolved administrations
- the Department for Business, Innovation and Skills
- the Research Councils
- Innovate UK
- the National Centre for Universities and Business
- other representative bodies such as Universities UK, GuildHE and the Confederation of British Industry.

21. The 15th HE-BCI survey is essential intelligence for all those interested in HE and the knowledge economy. Data from HE-BCI is used to develop policy and inform funding decisions for KE and related activities across the UK. The data is also valuable as management information, and supports benchmarking for a range of organisations, notably HEIs and their funding partners. Where comparable data is available for other countries, the data can provide a basis for international comparisons. HE-BCI data is accessible at no charge to UK HEIs via the Higher Education Information Database for Institutions (HEIDI); others are required to pay a small fee⁵.

22. The report highlights a number of caveats, although the overall dataset is considered informative and fit for purpose. Caution may be appropriate when viewing some data and trends in this report: specific concerns are highlighted in the text. In each survey year, HESA allows responding HEIs to restate previous figures to correct errors or include data that was not available at the time of submission. For the most part, this

⁵ Only summary data is included in this report; full data can be obtained from HESA (www.hesa.ac.uk).

report uses data as submitted (rather than restated) except where there are large effects (such as to skew the data noticeably for the UK as a whole).

23. While completion of the HE-BCI survey has been a condition of grant in Scotland since 2010-11, results do not inform Scottish funding allocation calculations as they do in England and Northern Ireland. The SFC is working with the Scottish HE sector towards ensuring a consistent response to the survey. HEFCW withdrew its Innovation and Engagement Fund from 2014-15 as a consequence of the introduction of the full-time undergraduate fee grant, so HE-BCI indicators no longer drive any funding for KE activity in Wales. HEFCW is continuing its work with the HE sector and the Welsh Government to drive a more consistent approach to the submission of survey data by Welsh institutions.

24. Standard practice in the HE-BCI survey is to present the current and previous years' data in cash terms, but to adjust for inflation on any time series of three or more years (given that the effect of low inflation is more significant over time than in the relatively short term). For example, graphs showing three or more years are likely to show a different (deflated) figure for 2013-14 than is listed in the annex tables of this report. The latest gross domestic product deflators are used for each survey, and the figures in real terms are updated (meaning that there may be slight differences between annual reports). This approach is universal across the annual series of HE-BCI reports.

25. Most financial income data is collected by partner type:

- commercial – small and medium-sized enterprises (SMEs)
- commercial – large businesses
- non-commercial – public and third sector⁶.

For some indicators (collaborative research, regeneration and sale of spin-off shares) data is not available by type of partner. Such data is shown as 'other', though it will doubtless include elements of the main categories.

26. While HESA's published data on the HE-BCI survey includes all HEIs that respond to the Finance Statistics Return, this publication excludes the University of Buckingham and University Campus Suffolk. This is because they are distinct from the publicly funded HEIs in the UK that receive KE funding at present. While this will have a negligible effect on overall income indicators when comparing the HESA and HEFCE reporting, it may affect proportional calculations (for example, where data has been rounded up or down).

27. In 2005-06 the timing of the survey was changed to bring it closer to the relevant academic year, and two years of financial and numerical data were collected at one time. To limit burden, only one year of qualitative data was collected; thus there are some qualitative time-series data where points are assumed⁷.

⁶ The 'third sector' refers to voluntary and community groups, social enterprises, charities, co-operatives and mutuals.

⁷ See 'Higher education – business and community interaction survey: 2004-05 and 2005-06' (HEFCE 2007/17), available at http://webarchive.nationalarchives.gov.uk/20120118171947/http://www.hefce.ac.uk/pubs/hefce/2007/07_17/, for further detail.

The survey and the wider economic context

28. HE-BCI results need to be seen in the context of wider economic and other conditions that impact on HEIs' interactions with their partners. During the early years of the HE-BCI survey the economy was fairly stable, and we highlighted that data and trends needed to be viewed in the context of changing factors in the HE environment, including the establishment of the survey itself.

29. Most HE-BCI data is collected by partner type, which is categorised into SMEs, large businesses, the public and third sector, and 'other'. 'Other' includes collaborative income. This survey therefore identifies 'income' to HEIs, which is a more efficient approach than surveying expenditure by all potential KE partners. The main indicators for which income to HEIs reflects the market value of these resources in the economy and society are collaborative research, contract research, consultancy, equipment and facilities, continuing professional development, regeneration and intellectual property (IP).

30. From 2014-15, the Finance Statistics Return and HE-BCI coding manuals have been split into separate collections. The HE-BCI survey in 2014-15 ran in parallel with HESA's official Finance Statistics Return, and collecting the data may be considered part of standard administrative practice. For 2014-15, there was no change to the data collection schedule dates for either record so they remained the same as they were for 2013-14. However in future years, there will be an adjustment to these dates⁸.

Next steps

31. As with most data returns, improvements can be and are made to process and content. These are balanced against the needs to keep the survey data consistent and comparable, and to respond to changing policy dynamics.

32. HESA and the HE-BCI stakeholders may reflect on the current licence number indicators, and whether the data collated can include both the number of items of IP being licensed and the number of end users benefiting from the licence, or similar figures which may benefit the sector without creating unnecessary burden in collation.

33. The 2016 HE White Paper has proposed a number of changes in the Higher Education and Research landscape. The HE-BCI survey will continue, with the stakeholders' group able to respond and reform as needed for the new structures. Further NCUB and HESA are collaborating to establish a community of practice of the HE-BCI micro data in the form of a user-group, bringing together analysts from within and without academia to build a shared understanding of the survey. The user group will provide advice to the stakeholders regarding the operation, use and development of the survey.

Analysis

34. Overall, the data shows that knowledge exchange activity from the UK higher education sector has continued its recent pattern of improvement, with increases across

⁸ Further information is available in 'Summary of changes since 2013-14', available at https://www.hesa.ac.uk/index.php?option=com_studrec&Itemid=232&mnI=14032 under 'Guidance for Higher Education – Business Community Interaction (HE-BCI) Survey Part A'.

most indicators and an increase in total income of 6.2 per cent from 2013-14 (£3.9 billion) to 2014-15 (£4.2 billion). There has been a small increase in European Regional Development Fund funding, although the increase is less than the decrease seen in European Structural Fund income. There has been a rise of 18.2 per cent in other local and regional regeneration funds, with one institution responsible for approximately a third of the income reported under this indicator. The year 2014-15 has seen a rise of 82.3 per cent in UK government regeneration funds. These have contributed to a total increase in regeneration and development programmes of 13.3 per cent. The numbers of active spin-offs and start-ups have increased slightly, although the turnover and levels of investment have increased by a higher rate, suggesting that the commercial success of these firms has improved.

35. HEIs' income from knowledge exchange activity with large businesses increased by 6.6 per cent from £769 million to £819 million in 2014-15, while equivalent income from public and third-sector partners remained steady, with growth of 1.4 per cent from £1,335 million in 2013-14 to £1,353 million. HEIs increased income from SMEs by 7.8 per cent from £201 million to £217 million across the UK.

Strategy and infrastructure

36. Indicators relating to strategy and infrastructure are collected under Part A of HE-BCI (whereas financial and numerical metrics are collected in Part B)⁹. These tend to be self-assessed responses in which HEIs either select from a range of options (this is how IP is handled, for instance) or place themselves on a scale of development (as with incentives to engage with business and the community, which may be 'weak', 'medium' or 'strong'). The latter are known as 'benchmark questions'.

37. Most of the data is designed to give an overview of how KE is being embedded in HEIs; hence it is often displayed as proportions of the sector rather than the totals used for quantitative indicators.

38. Each HEI is asked to select three areas which it regards as making the greatest contribution to economic growth – see Table 2. The options available for HEIs to select were changed in 2013-14, so direct comparisons with data recorded in previous years would not be like-for-like and should therefore be treated with caution.

39. 'Research collaboration with industry' is the most important single most reported contribution HEIs make to economic development, while 'Knowledge exchange' is the next most cited. 'Knowledge exchange' here is a more generic way of looking across a range of external interactions.

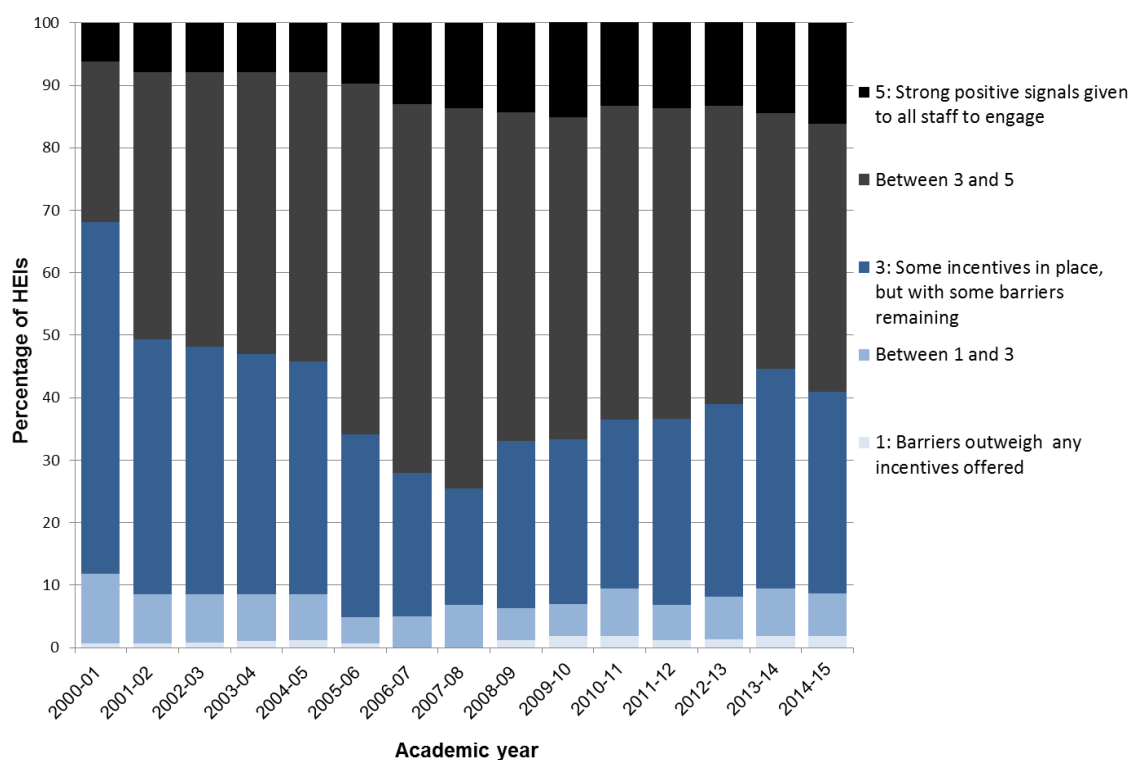
Table 2: What are the top three areas of economic impact for your HEI?

Activity	% of UK HEIs
Research collaboration with industry	42
Knowledge exchange	40
Widening participation and access	39

⁹ The full questionnaires are available at https://www.hesa.ac.uk/index.php?option=com_studrec&Itemid=232&mnI=14032.

Supporting small and medium size enterprises	32
Meeting national skills needs	30
Meeting regional skills needs	24
Developing local partnerships	19
Attracting non-local students to the region	17
Graduate retention in local region	14
Helping with student and graduate enterprises	9
Commercialisation (such as spin-off activity and licensing)	9
Provision of incubator support	7
Support for community development	6
Attracting inward investment to region	5
Management development	5
Facilitating networks	1

Figure 4: Incentives for staff to engage with business and the community, 2000-01 to 2014-15



Source: HE-BCI Part A Question 7 (data for 2002-03 and 2003-04 is assumed – see paragraph 27).

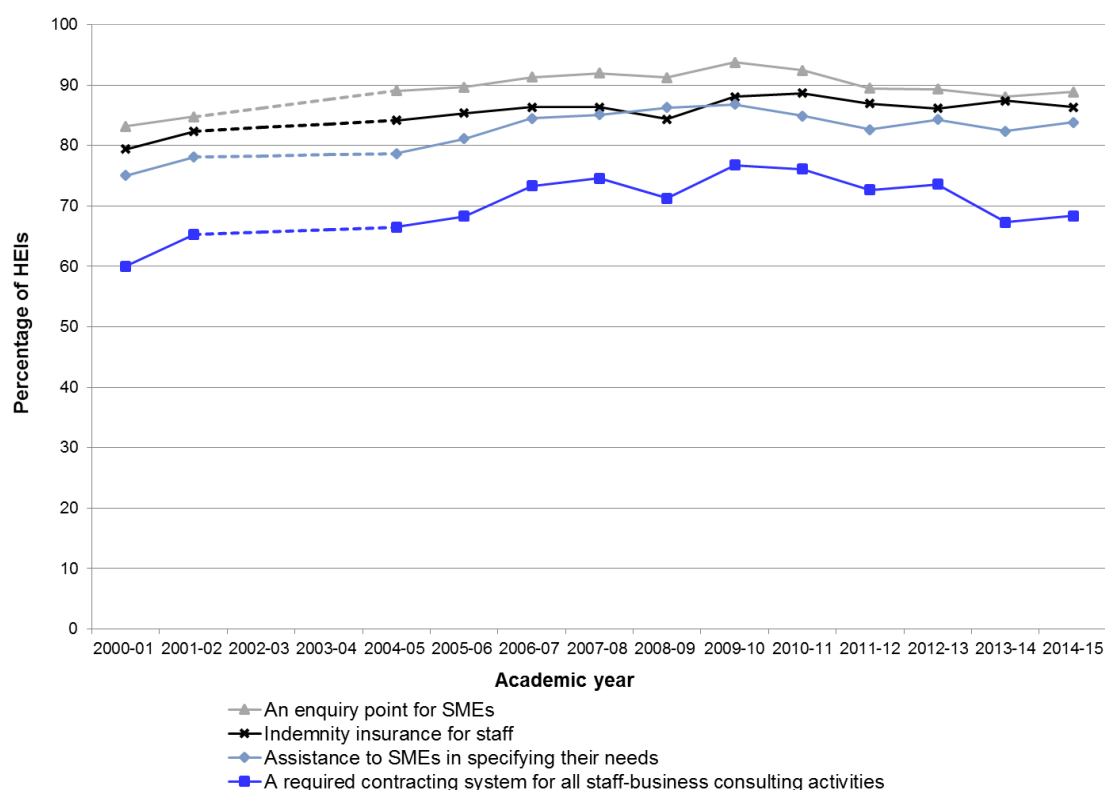
40. Figure 4 shows how HEIs rate the level of incentive for staff to engage with business and the community, assessing themselves against a five-point scale where '1' represents barriers outweighing incentives and '5' suggests strong incentives in place.

41. The number of HEIs reporting positive staff incentives to engage with external partners have increased slightly (2 per cent) from the previous year, with those reporting a strong positive signal continuing the steady increase noted in previous years. There has been a small decrease in the proportion choosing option 3 (that there are some incentives in place but with some barriers remaining). A fall in the numbers selecting options 1 and 2 means that an increasing number of HEIs report positive incentives, while fewer report barriers outweighing incentives.

42. A five-point benchmark assesses the extent to which a business support strategy is embedded in HEIs (from limited to full implementation). The data for 2014-15 shows a small decrease, with 37 per cent responding that their strategic plan is developed and implemented as a result of an inclusive process across the HEI, in comparison with last year's figure of 38 per cent. In another five-point scale used to indicate the strategy for public and community engagement, 31 per cent of HEIs selected the highest category, a figure which has decreased by 3 per cent from the previous year.

43. Figure 5 shows some changes in infrastructure indicators, with three of the indicators recovering slightly following recent falls. This improves slightly on last year's equivalent data, but all four indicators remain below their peaks.

Figure 5: Selected infrastructure indicators, 2000-01 to 2014-15



Source: HE-BCI Part A Question 11 (data for 2002-03 and 2003-04 are assumed – see paragraph 27).

44. Not all HEIs have a sufficient 'pipeline' of technology to warrant a dedicated unit or specialist staff (such as IP lawyers) to commercialise research, although some employ private-sector intermediaries.

45. Table 3 shows the internal mechanism: how HEIs identify IP with economic and social potential. Table 4 is the mechanism used to collaborate with external parties to exploit the IP.

Table 3: How HEIs identify and protect IP

	UK	England	Northern Ireland	Scotland	Wales
HEI files IPR in house (including HEI shared or collaborative action)	37%	37%	50%	39%	25%
HEI outsources filing on IPR (to a non-HE organisation)	62%	61%	25%	61%	100%
HEI takes other IP protection action	49%	53%	25%	28%	50%

Note: 'IPR' = 'intellectual property rights'.

Table 4: How HEIs identify commercial opportunities for protected IP

	UK	England	Northern Ireland	Scotland	Wales
No action taken	15%	16%	50%	6%	0%
Yes, external agency	10%	11%	0%	0%	25%
Yes, in-house capability	43%	40%	25%	61%	63%
Yes, in-house capability and external agency	32%	34%	25%	33%	13%

Source for Tables 2 and 3: HE-BCI 2013-14 Part A.

46. The data suggests that external parties are used most in identifying potential IP (62 per cent of UK HEIs) (Table 3), while 'in-house' is the most common response in terms of finding the right partner for the IP (Table 4). The data is relatively consistent across UK nations. However, Tables 3 and 4 show that HEIs may have more than one route available for both parts of the process, which seems reasonable given the diversity of types of, and potential partners for, IP.

Research-based interactions

47. Research-based interactions cover a very wide spectrum of activities, from collaborative research (perhaps the most distant from the market in HE-BCI) through to the commercialisation of ideas and the establishment of new companies (close to the market). Many organisations that operate partnerships with HEIs note that direct

engagement in collaborative research is particularly valuable for sparking new ideas and approaches.

Collaborative research

48. Although income from IP is a useful measure of an HEI's strategy in commercialising its research, collaborative research may be more useful for understanding the value of long-term relationships between HEIs and their partners in business and the wider community. Collaborative research, as defined in HE-BCI, is academic research which has public sponsorship and at least one other external partner. It is undertaken with partners such as research organisations, private business, other HEIs, Government and the third sector, and includes at least one other non-academic organisation. The fruits of the research are assumed to be shared among all partners.

49. Collaborative research is often multidisciplinary and individual to the context of a particular project and its partners. To complement other sources of data (such as industrial research income as collected in the main HESA finance record), the HE-BCI survey examines only a subset of collaborative research. Income should be recorded only where the activity has a defined aim and there is input from at least three parties: the HEI, a public funder and one or more external partners. To measure the most complete proxy for the value of the collaborative research, HEIs provide figures on the public contribution (in money) and contributions both of money and in kind from the external partner.

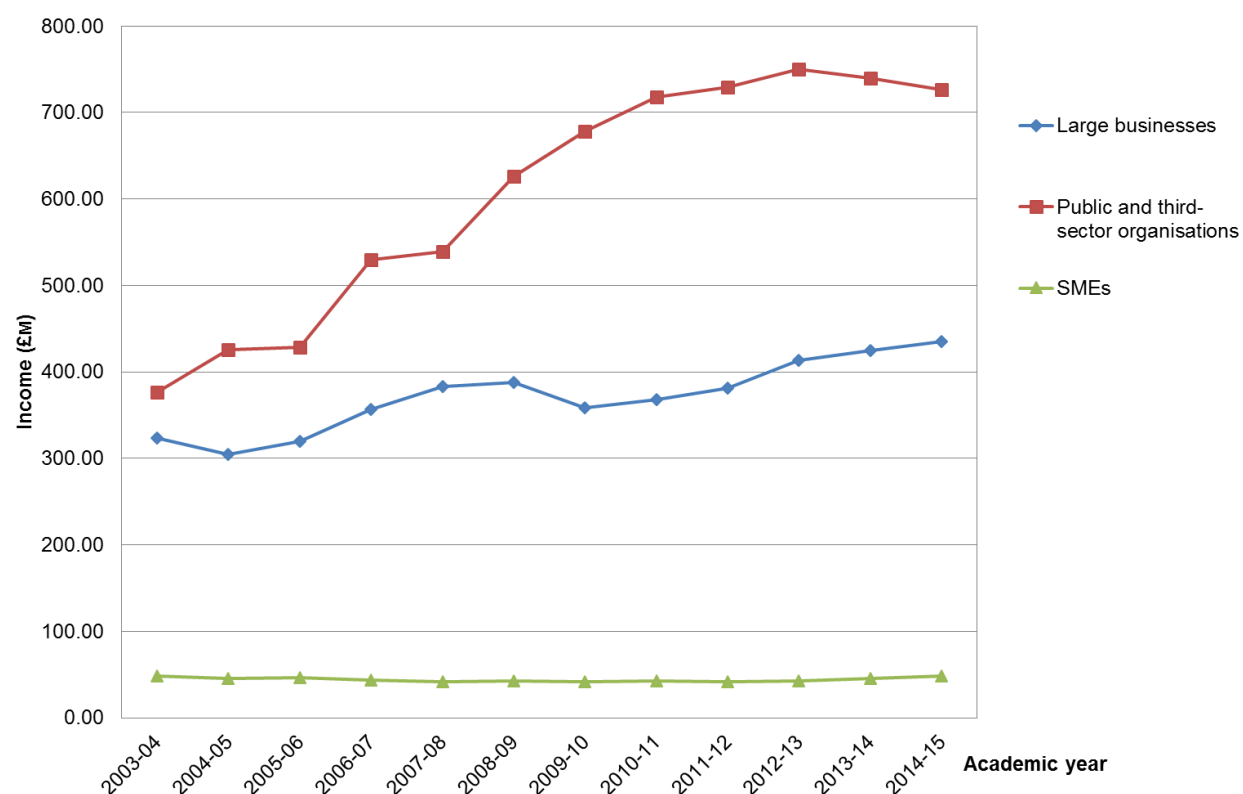
50. The total reported income for collaborative research rose by 9.9 per cent last year, from £1,144 million to £1,257 million. The majority of the increase (53.4 per cent) is attributed to public funding (a reduction on the previous year's figure of 76.2 per cent), with the remainder attributed to collaborative cash and in-kind contributions. Increases were seen across all public funders, with the exception of the European Union government, which saw a reduction of 2.2 per cent. Increases were seen from other public funders, with a 9.0 per cent rise reported in Department for Business, Innovation and Skills Research Council income, and 13.0 per cent from other UK government departments. Support in kind from external partners increased by 13.6 per cent. The total increase in cash from external partners was larger in value and percentage terms than contributions in kind, the reverse of the previous year's position.

Contract research

51. Contract research, usually where a specific question is being researched, is a simpler transaction where the benefit is assumed to be primarily to the external partner, in contrast with the mutual gains obtained by collaborative research. Total income from contract research rose by 1.5 per cent to £1.210 billion in 2014-15. Spending by large business increased by 4.1 per cent (to £435 million) and income from SMEs by 6.3 per cent (to £48 million), which is a slight fall in cash and percentage terms from the previous year's increase. Income from public and third-sector partners (which remains the largest share by a margin) saw a fall of 0.3 per cent, to £727 million from £729 million in the previous year¹⁰. Figure 6 shows how contract research income has varied over time.

¹⁰ This takes into account a correction made to data from 2011-12 by a Scottish HEI.

Figure 6: Contract research income, 2003-04 to 2014-15 (real terms)

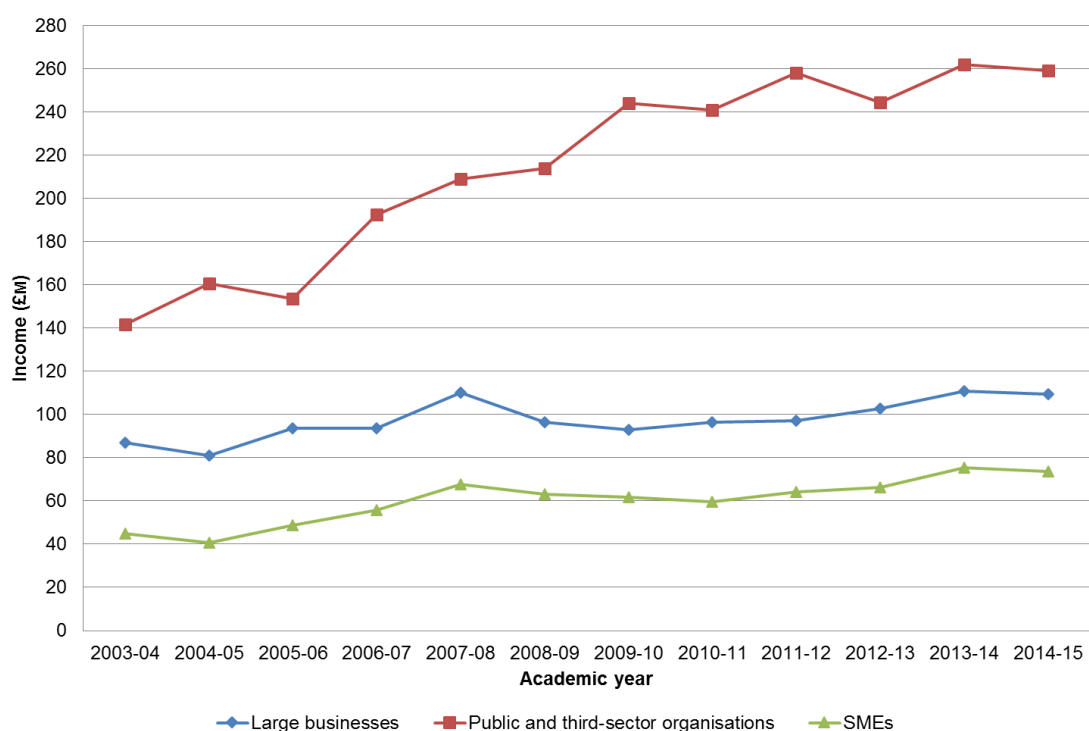


Consultancy

52. Consultancy agreements deliver expert advice and intellectual input to assist a client in analysing a particular issue ('the innovative application of existing knowledge'). In this survey, HEIs' innovative application of existing knowledge on behalf of an outside party is defined as 'consultancy'; this, rather than more formal research, may be the preferred method to access expert advice and less tangible knowledge. The knowledge itself may not be new, but it can often inform more immediate innovation. Indeed, this may be a source of 'open innovation' practice, where IP rights are less important than the usefulness of the knowledge to a particular situation or problem.

53. HEI income from consultancy held steady in 2014-15, with growth of 0.2 per cent, rising from £441 million to £442 million. SMEs saw a fall of 0.8 per cent to £74 million, large businesses rose by 0.3 per cent to £110 million, while public and third-sector organisations saw an increase of 0.5 per cent to £259 million. Figure 7 shows consultancy income from 2003 to 2015 (2014-15 data shows a drop because it is adjusted for inflation – see paragraph 24).

Figure 7: Consultancy income, 2003-04 to 2014-15 (real terms)



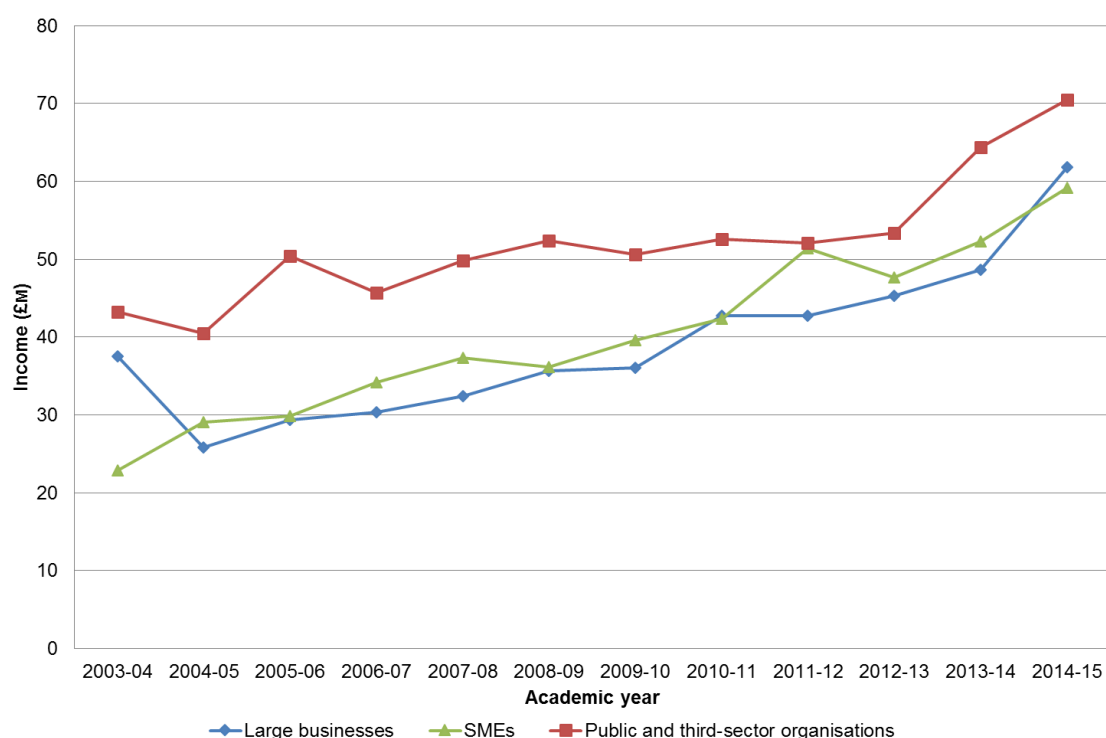
Source: HE-BCI Part B Table 2a.

Facilities and equipment

54. HEIs' specialist equipment and facilities, such as 3D printing, super-computing and biomechanical consultancy, support their teaching and research. There are many benefits from providing access to these resources for partners, especially as a way of developing relationships. The external partner benefits from and gains access to facilities that they may not have the resources to secure in-house. The HEIs benefit from understanding the potential 'real world' applications of their research.

55. Overall, income from facilities and equipment saw growth of 17.5 per cent, from £163 million to £191 million in 2014-15. Large businesses' spending increased by 29 per cent, from £48 million to £62 million. Spending by SMEs continued its recent rise with a 14.8 per cent increase, from £51 million to £59 million, while public and third-sector organisations increased spending by 11 per cent, from £63 million to £70 million. Figure 8 shows facilities and equipment income values between 2003-04 and 2014-15.

Figure 8: Facilities and equipment, 2003-04 to 2014-15 (real terms)



Source: HE-BCI Part B Table 2b.

Intellectual property and enterprise

56. The translation of research outcomes into products and services can be a long process, and further time is then required for the technology to prove itself in the marketplace. Once the HEI has acquired formal intellectual property rights – through patents, copyright, design registration or (more rarely) trademarks – it is common either to license the innovation to an existing company or to set up a new ('spin-off') company, which will likely take more time to generate significant financial returns.

57. When a new company is set up, the HEI may choose to own it outright, retain a proportion of the stock, or float it all. The HE-BCI survey measures the income from the sale of shares in such companies. Hence, to gain a complete picture of the return from an HEI's IP rights, one should always consider both the licensing and spin-off routes.

58. The timescales associated with the formal commercialisation of IP rights are especially long for fields linked to medicine or defence. And, as in previous years, a small number of outliers were responsible for a significant proportion of the reported external investment received for staff start-ups and sale of shares in spin-offs.

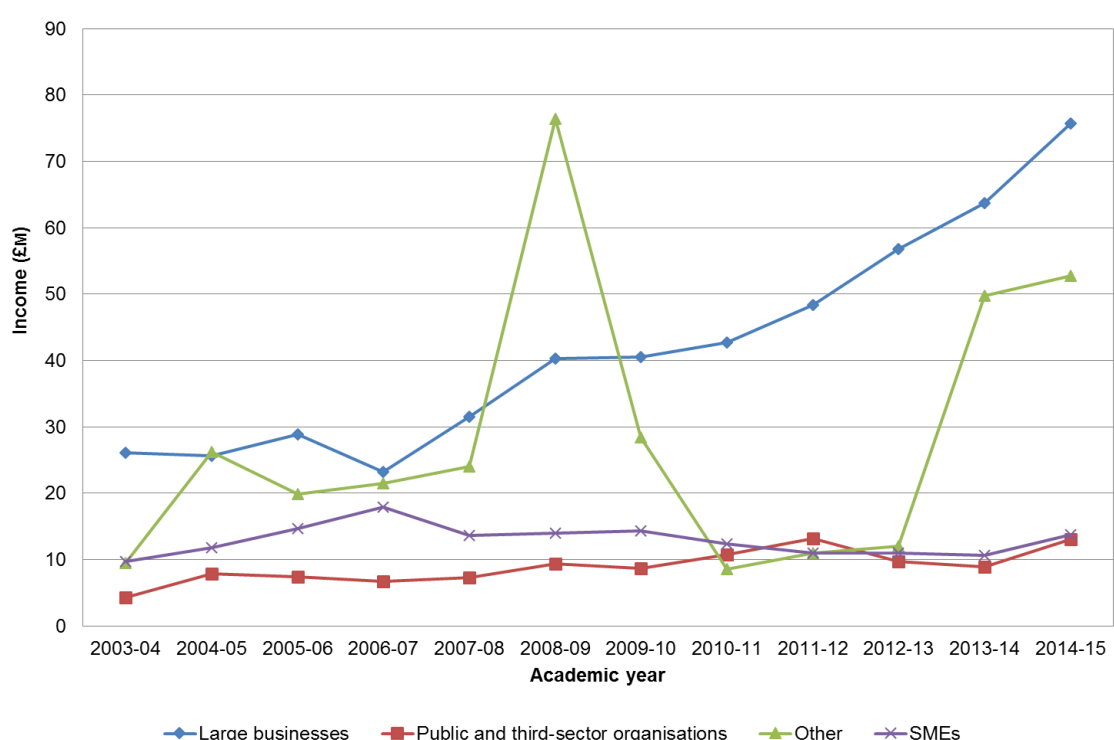
59. There has been an increase of 18.5 per cent in IP income, from £131 million to £155 million in 2014-15. When we look at the income from licensing only (thus excluding the sale of spin-off companies), there was an increase from £82 million to £103 million in 2014-15 – a rise of 25.1 per cent. One institution remains responsible for approximately a quarter of income reported under this indicator. Data is collected separately for software and non-software licences because the former typically have shorter life-spans and lower

values (though this does not mean they are less important). This is because incremental improvements to software can be made far more readily than, say, changes to the engine of a passenger jet.

60. There are noticeable differences in the income by partner and type of licence. Large business spending on licences increased from £63 million to £76 million in 2014-15 (20.7 per cent). Public and third-sector spending increased by 48.9 per cent, and income from SMEs rose by 31.4 per cent, after both experienced a fall in the previous year. Figure 9 shows income from IP between 2003-04 and 2014-15 by partner type.

61. Income from non-software licences grew by 31.6 per cent, from £66 million in 2013-14 to £87 million in 2014-15, with growth being seen from SMEs, large businesses, and public and third-sector organisations.

Figure 9: Income from intellectual property rights, 2003-14 to 2014-15 (real terms)



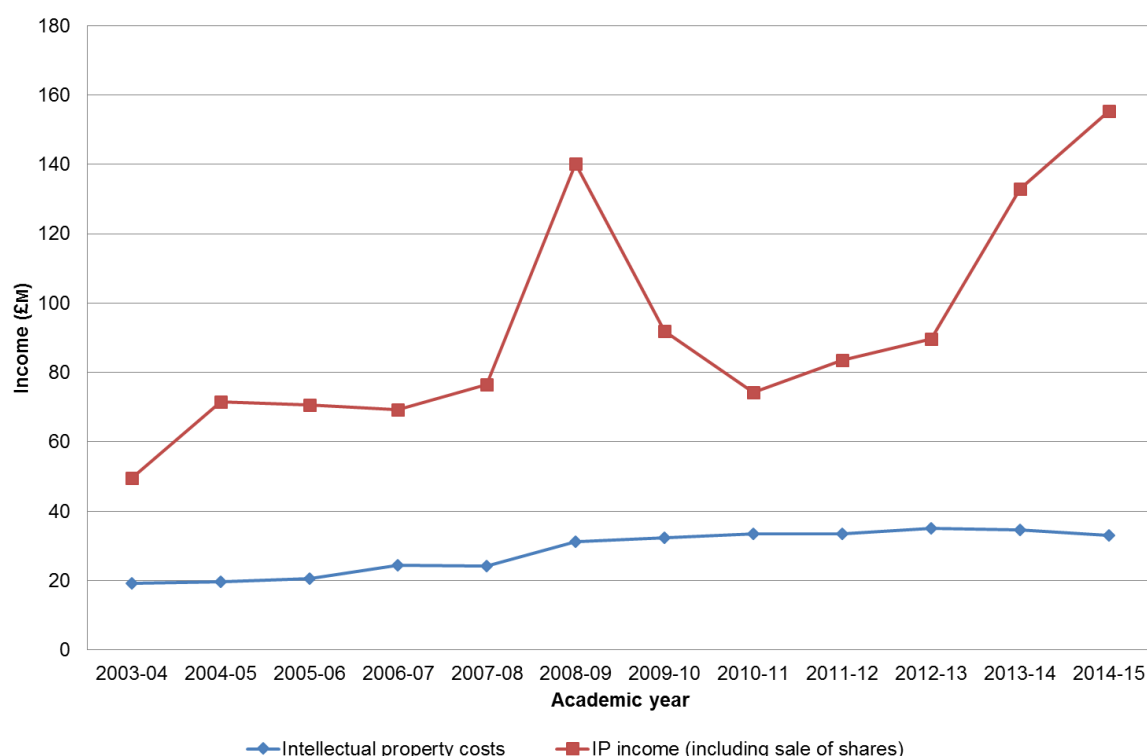
Source: HE-BCI Part B Table 4c.

62. Software licenses and 'Other' are much smaller categories than non-software licences. Software licences saw an income growth of 28.7 per cent, from £6.8 million to £8.7 million in 2014-15, with rises in SME and public and third-sector income balancing out falls in income from the large business sector. Given the complex nature of IP there are activities where income is received without a licence in place, referred to simply as 'other' IP income; this indicator fell by 24.5 per cent to £6.9 million in 2014-15. Sale of shares in spin-off companies increased from £49 million to £53 million in 2014-15; note though that two institutions account for over 80 per cent of all income in this indicator in 2014-15.

63. Data for 2014-15 saw IP protection costs decrease from £34.2 million to £33.0 million. These costs include formal fees for patents and associated staff costs (of, for example, patent lawyers).

64. As illustrated in Figure 10, the sector as a whole received almost five times as much income from licensing and spin-off equity as it spent on IP protection. The majority of HEIs report that income exceeds expenditure, although 23.0 per cent of HEIs in 2014-15 continue to spend more on protection. The UK performs favourably against other nations where data is available (more information at Annex B).

Figure 10: Income and expenditure on intellectual property, 2003-04 to 2014-15 (real terms)



Source: HE-BCI Part B Table 4c

65. There was a 2.4 per cent decrease in the number of patents granted, from 976 to 953 in 2014-15. This was as expected following a relatively low number of patent applications recorded during the previous two years. Patent data should be viewed over a longer time series because of the time lag between applications and grants. Patent applications have increased by 3.4 per cent, from 2,086 in 2013-14 to 2,156 in 2014-15. Since 2003-04 (Figure 11), HEIs have seen more disclosures from their staff that have translated into patent applications, and higher numbers of active patents. Patent applications recorded in 2014-15 remained roughly double the number of patents granted during the same year.

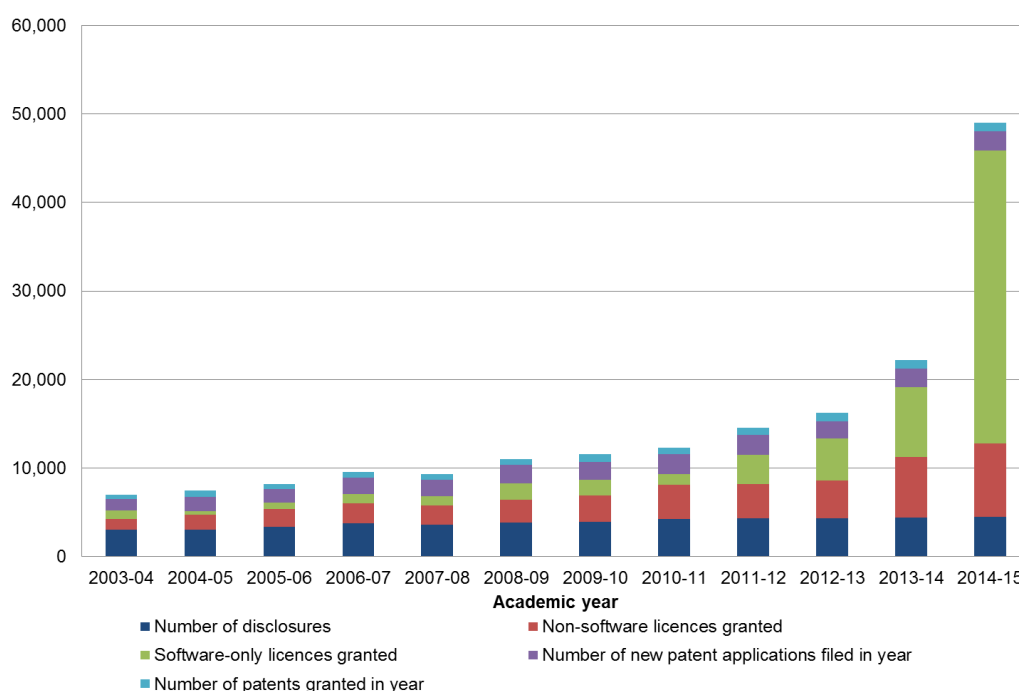
66. The diversity of practice in how numbers of licenses are recorded makes analysis problematic: for example, the invention of a computer operating system may be considered a single piece of IP (most likely copyright), while, in fact, users are required to

buy one license for each machine that runs the system. Both methods are valid, but an alternative method of recording this information may be consulted upon, building on previously collated data. Growth in the number of non-software licences granted has risen by 19.8 per cent for 2014-15, while numbers of software licences have increased by 321.7 per cent. The latter figure highlights the diversity in how institutions record this activity, with some recording the number of individual items of software licensed, whilst others record the number of times an item of software has been licensed. This diversity of approach suggests that a re-examining of the indicator may be required.

67. The value of software license income from SMEs has increased by 41.8 per cent, while the number of software licenses with SMEs has increased by 76.9 per cent. Non-software licenses with large businesses have increased by 19.9 per cent, while income in this category has increased by 29.8 per cent. The number of non-software licenses for public and third-sector organisations has increased by 19.8 per cent, and these have risen in value by 50.5 per cent. These trends may be skewed by a small number of HEIs reporting a large volume of activity.

68. Figure 11 shows the recent dramatic increase in numbers of licenses – mainly from software. There have been a number of cases investigated and validated, many of which relate to software applications ('apps'). When this survey began, smartphones were not in common use whereas now we are now familiar with a technology that will see thousands of licenses being activated in a few days. The stakeholders group is working with HESA to update the questionnaire to allow disaggregation between the number of inventions licensed and the number of (end user) licenses.

Figure 11: Disclosures and patent numbers, 2003-04 to 2014-15

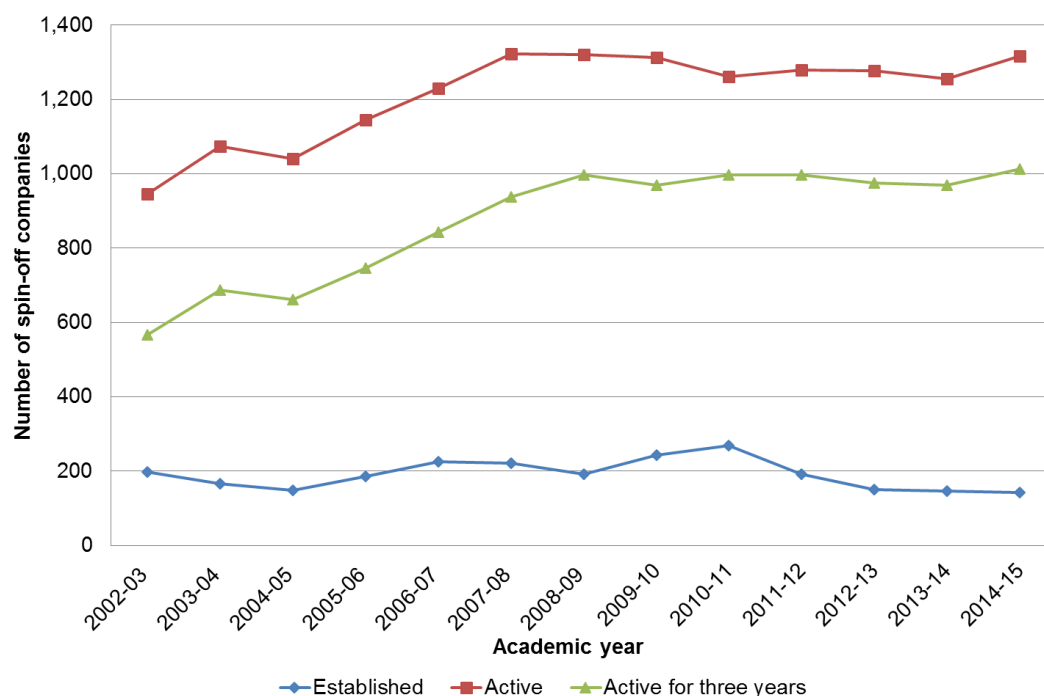


Source: HE-BCI Part B Tables 4a and 4b.

69. The HE-BCI survey collects data on formal spin-off companies based on IP where the HEI maintains some ownership, and those that are sold outright. For total spin-off numbers these two data sets are summed (see Figure 12). The licensing of new inventions to an established company is usually the most efficient way of exploiting IP, but in some contexts, such as a lack of suitable clients, creating a spin-off company is the best choice. Spin-offs are unlikely ever to be the most popular option for exploiting IP, but for some particularly promising ideas they can be the best way to maximise impact and value for the HEI and for the economy more broadly.

70. Data from 2014-15 continued to show a declining number of new spin-off companies, from 147 in 2013-14 to 142 in 2014-15; this represents a 3.4 per cent drop. The number of spin-off companies surviving three or more years, however, increased from 970 to 1013 active firms in 2014-15.

Figure 12: Spin-off companies formed, 2003-04 to 2014-15



Source: HE-BCI Part B Table 4d

71. Staff start-up companies are businesses set up by HEI staff. They are distinct from spin-off companies as they are not specifically based on IP emerging from an HEI, and may not even be directly related to the academics' areas of expertise (although most likely are). The number of start-up companies set up by HEI staff increased by 2.9 per cent in 2014-15 from 68 to 70. Those surviving three or more years increased by 9.1 per cent, from 307 in 2013-14 to 335 in 2014-15 across the UK.

72. Data on company formation is likely to be incomplete, so must be treated with caution. HEIs have developed systems to record such data, but income to businesses is not as efficient a proxy of knowledge exchange as income to HEIs. Estimates of the turnover of formal spin-offs and their staffing increased in 2014-15, by 138.6 per cent and

18.9 per cent respectively. The turnover indicator for 2014-15 includes a figure submitted by an institution that incorporates the combined turnover of a spin-off and the organisation that acquired it.

73. Graduate start-ups are defined as companies formed within two years of graduation, which may or may not be IP-based and include various types of enterprise including commercial and social enterprises. The number of start-ups decreased by 9.6 per cent, from 4,603 in 2013-14 to 4,160 in 2014-15, although the number surviving three or more years rose by 15.5 per cent. During the same period, turnover increased by 36.7 per cent to £174 million, while external investment increased by 307.4 per cent to £228 million, the latter figure incorporating significant investment received by a single graduate start-up in the surveyed year.

74. Reported figures for the number of people employed by graduate start-ups increased last year by 12.5 per cent. Data on graduate start-ups is difficult for HEIs to track effectively because it is only available when volunteered.

75. Recent years have also seen a greater interest, especially among graduates, in social enterprises (organisations that apply commercial strategies to maximize improvements in human and environmental well-being, rather than profits for external shareholders). From 2013-14, HE-BCI began collecting specific data on social enterprises. A number of outliers contributed significant proportions of the estimated figures for the current turnover of all active social enterprise firms, and for the external investment received by social enterprise spin-offs.

76. New data always requires extra caution. It is anticipated that the availability of data for a number of years will allow future reports to include analysis of this group of indicators.

Social, community and cultural activities

77. The HE-BCI survey also collects data on public events run by HEIs. These illustrate the wide-ranging civic, community and cultural contributions that HEIs make, though they describe only a small part of that range.

78. The HE-BCI survey looks at the commitment made by HEIs to public and community engagement by counting attendees at public events, such as dance, drama, other performances, film and public lectures. Attendance levels are an imperfect proxy for the range of activity that engages the public. Data for 2014-15 shows substantial changes since the previous year¹¹.

79. Attendance at public events has increased, with a rise in attendee numbers of 47.3 per cent at free events and 14.5 per cent at chargeable events.

80. The number of attendees at free public lectures increased by 16.7 per cent. A decrease for free performance arts events of 89.5 per cent was attributable, in part, to a single institution which had played a leading role in a series of international events in 2013-14 returning to figure more in line with their long term trend. A substantial increase

¹¹ Such data is very difficult to collect consistently across the sector, because it encompasses a broad range of activities and is not directly used in funding.

of 50.7 per cent in the number of attendees at 'other' free events (which include TV and radio broadcasts, YouTube videos, podcasts and virtual learning environments) is a result, in great part, of an increase in broadcast audiences for one HEI that returns a significant portion of the total figure for this indicator increasing its audience share via online services.

81. To illustrate the scale of HEIs' commitment to social, community and cultural activities, if we assume a consultancy rate for academics of £500 per day, the value of the total academic time devoted to public events is over £57.3 million.

Regeneration

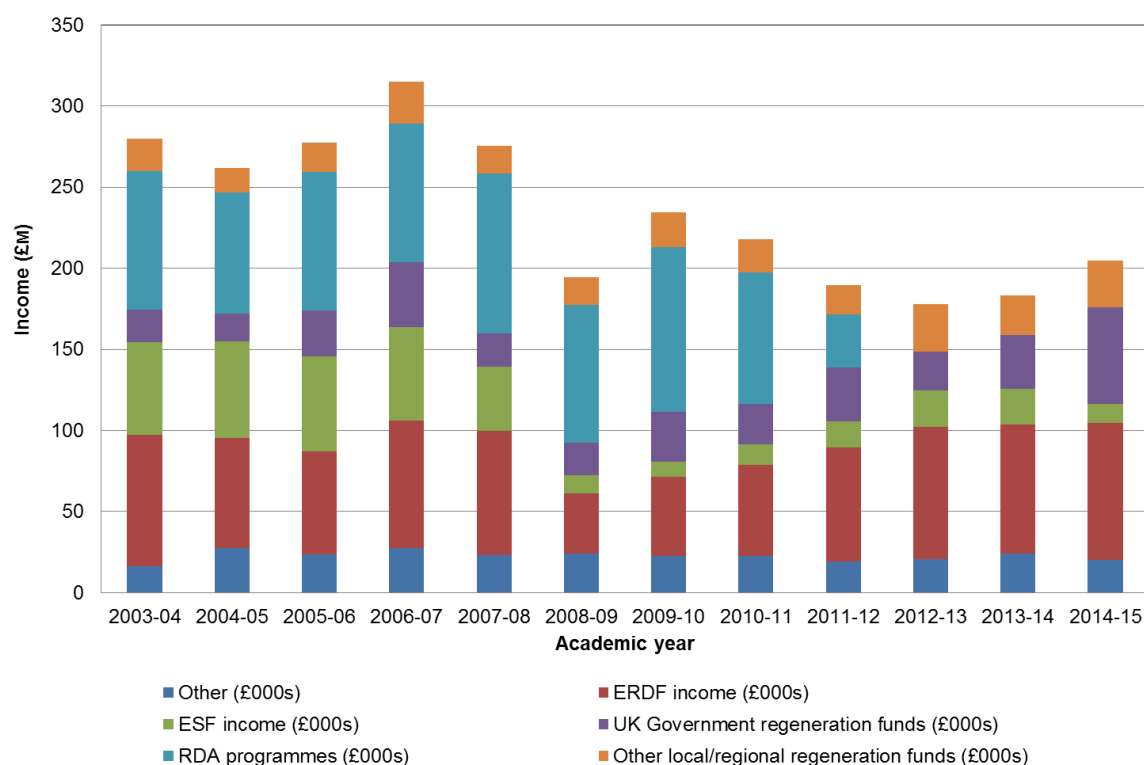
82. Regeneration funding is an important way for HEIs to invest intellectual assets in economic, physical and socially beneficial projects. Projects often link to other activities, such as matched funding for SMEs to access consultancy or continuing professional development (CPD). There are also larger, more transformative programmes such as the Local Growth Fund and European Regional Development Funds, where HEIs act as anchors for local economic development and regeneration.

83. Regeneration activity covers a wide range of interactions, from urban renewal to community development. HEIs are involved in a variety of such initiatives, including large-scale European structural regeneration projects, as well as providing targeted support to recently redundant individuals and employability advice and training to graduates.

84. Total income from regeneration activity as reported by HEIs increased by 13.3 per cent, from £181 million to £205 million in 2014-15 (Figure 13). This included a rise of 82.3 per cent in UK government regeneration funds, from £32.7 million to £59.5 million in 2014-15. There has been a rise of 18.2 per cent in other local and regional regeneration funds, with one institution responsible for approximately a third of the income reported under this indicator.

85. European Regional Development Fund (ERDF) income increased by 7.4 per cent, while European Structural Fund (ESF) income fell by 43.7 per cent. Other local and regional regeneration funds rose by 18.2 per cent. Overall, regeneration funding is at the highest level seen since 2011-12.

Figure 13: Regeneration income, 2003-04 to 2014-15 (real terms)



Note: 'RDA' = 'Regional Development Agency'. Source: HE-BCI Part B Table 3.

86. Table 5 shows how HEIs deploy regeneration funding (more than one option may be selected). In general, research and teaching facilities benefit, many of which then promote the HEIs external engagement. These activities further support the position of HEIs as regional 'anchors' for social and economic benefit. For example, HEIs are often central to relatively large capital projects which provide opportunities for further interaction with partners in the locality and beyond.

Table 5: Benefits from key regeneration funding programmes

Activity	England	Northern Ireland	Scotland	Wales
Adding and improving capability for				
– research (resource)	43%	25%	72%	100%
– teaching and learning (resource)	37%	0%	39%	38%
New and additional funds for				
– research capital (buildings)	23%	25%	28%	50%
– research capital (equipment)	18%	50%	33%	50%
– teaching capital (buildings)	9%	0%	39%	38%
– teaching capital (equipment)	32%	0%	6%	0%
Not engaged in any regeneration programmes	37%	50%	17%	0%
Strengthening and facilitating links with the non-academic community	57%	50%	72%	63%

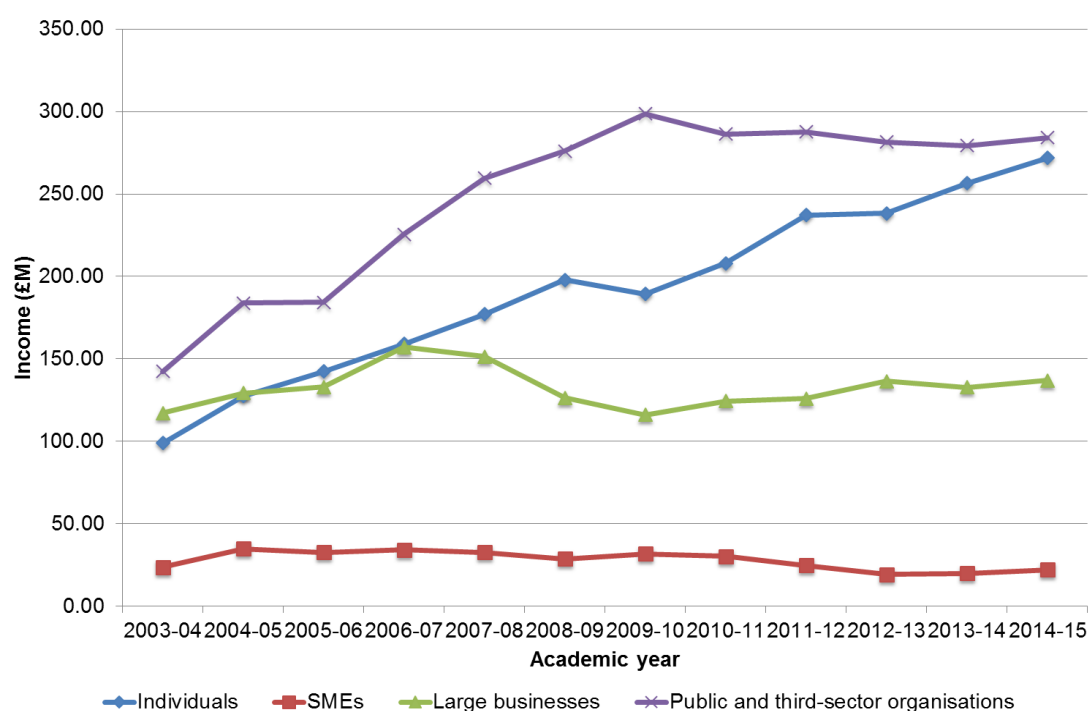
Continuing professional development

87. CPD is an important engagement activity for HEIs. Some CPD courses are relatively formal, enabling students to retain a licence to practise or gain membership of a professional, statutory or regulatory body; other CPD is more task-focused, for instance selecting particular modules from an MBA course to develop a specific business resource. CPD provision may or may not contribute to course credits, and may lead towards a named award and a qualification.

88. It is, however, very difficult for HEIs to collect complete, accurate data on the potential impact of CPD, given that any module may contain a range of learners including students who are aiming for course credit and those who are not.

89. CPD is paid for by a variety of sources including employers and the students themselves. (Individuals may sign up for education courses and be reimbursed later by their employer – a fact that may not be apparent to the HEI – while sole traders may not see the distinction between employer and self-funding as relevant.) Since disaggregating this data would be overly burdensome, data is also returned for individuals in continuing education. It is, however, assumed that much of this education is of benefit to the wider economy.

Figure 14: CPD and continuing education income, 2003-04 to 2014-15 (real terms)



Source: HE-BCI Part B Table 2c.

90. Recorded income from CPD rose from £678 million to £715 million in 2014-15, a 5.4 per cent rise. All types of partner saw rises, with income from large businesses rising by 4.6 per cent, income from SMEs experiencing a rise of 12.9 per cent, and income from public and third-sector organisations rising by 3.2 per cent. In addition, continuing education and CPD for individuals experienced a rise of 7.5 per cent, from £253 million to

£272 million in 2014-15. This does not include a figure of £27 million included in error by one institution in the figure published by HESA in April 2016.

91. Total 'learner days' of CPD and continuing education (which, it should be noted, are difficult to calculate accurately) were recorded at 3.9 million in 2014-15, representing a 1.4 per cent increase from the previous year.

Annex A: UK and national data tables

This annex is available as a separate Excel file alongside this publication at www.hefce.ac.uk/pubs/year/2016/201418/.

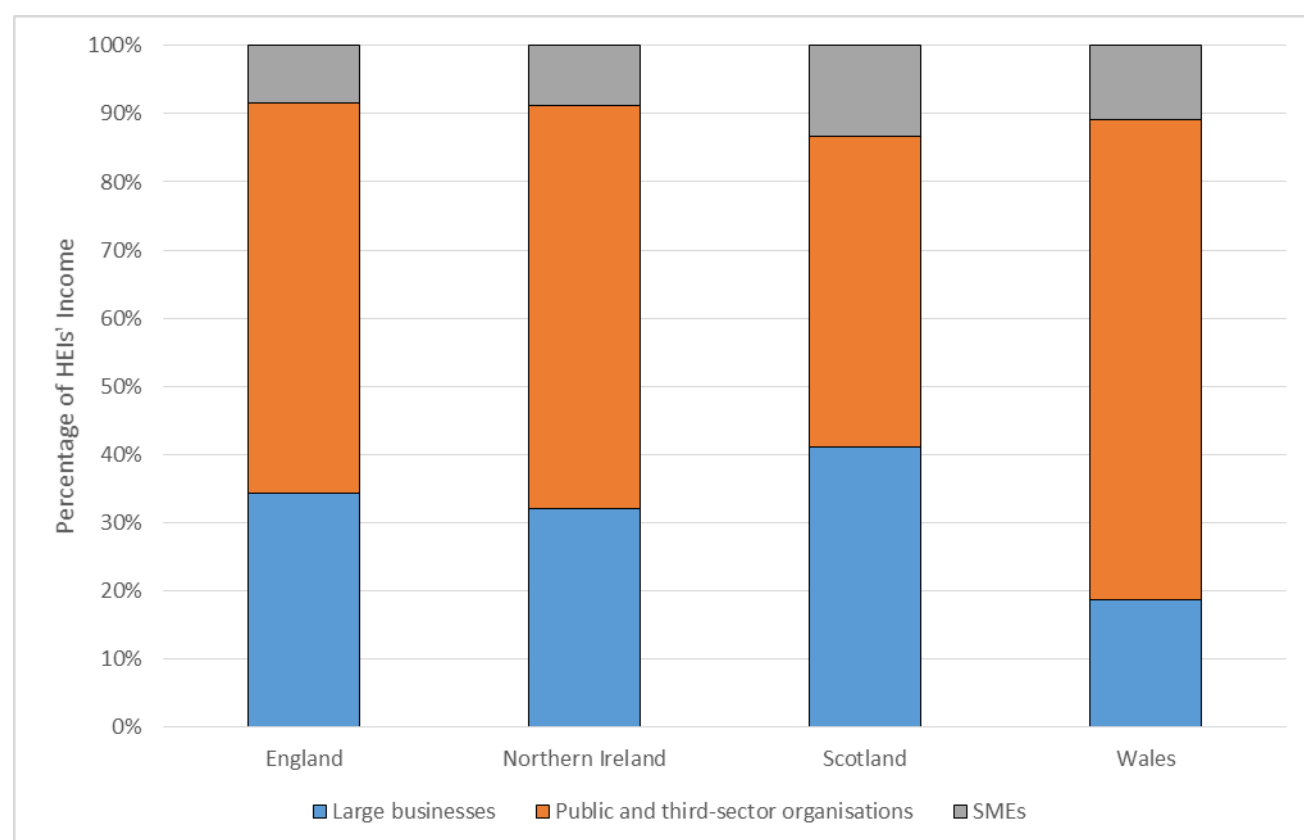
Annex B: Summary data by UK, England, Scotland, Wales and Northern Ireland

1. Data on the constituent UK nations can be accessed as a separate Excel file alongside this publication at www.hefce.ac.uk/pubs/year/2016/201618/.
2. Data recorded in these annexes for 2013-14 is as originally reported. Restated data is not included in these documents.

Comparisons between UK nations

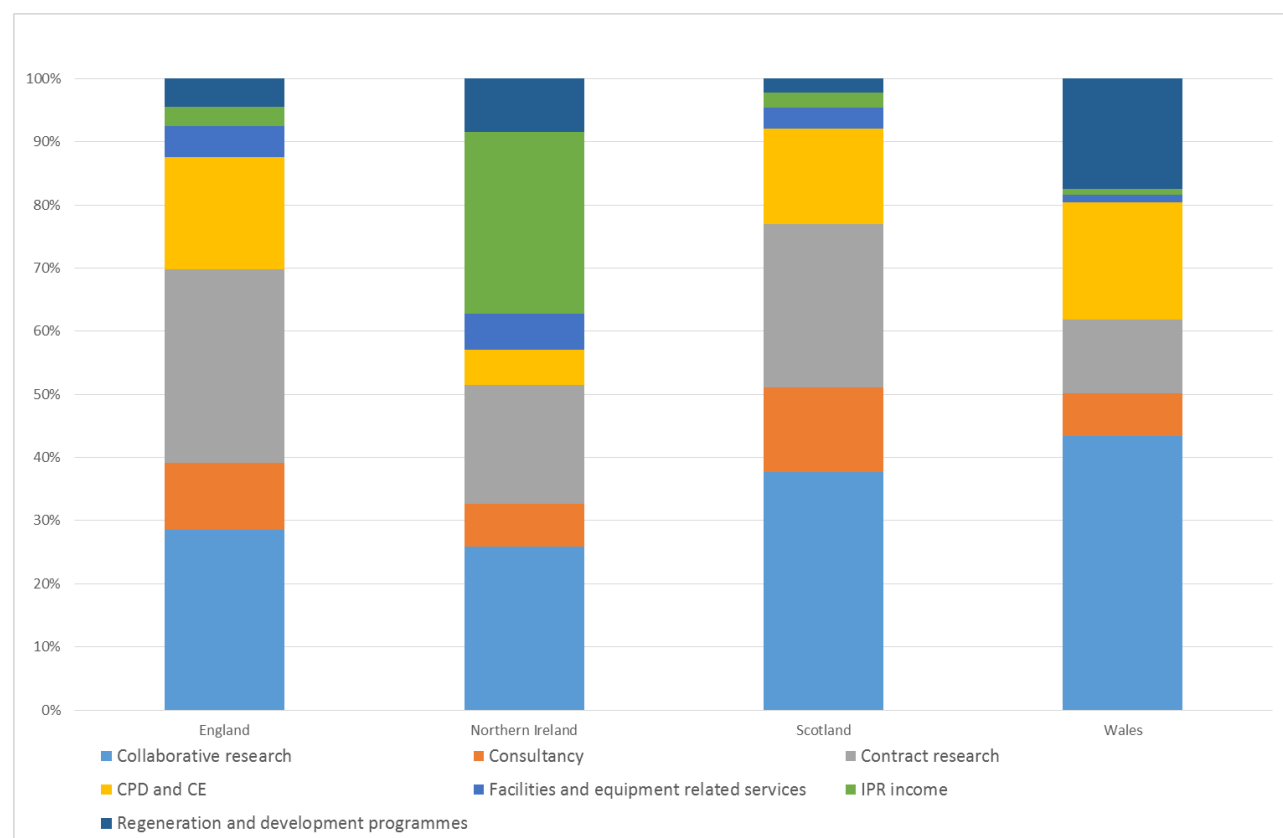
3. Overall income from activities and partners is broadly comparable between the four UK nations, as shown in Figures 15 and 16. Data for selected indicators is displayed as a proportion of income for the higher education institutions in those nations, so as not to reflect relative economic size.

Figure 15: Income across UK nations



Note: 'SMEs' = 'small and medium-sized enterprises'. Source: HE-BCI Part B Tables 1 and 2.

Figure 16: Income by partner across UK nations



Note: 'CPD' = 'continuing professional development'; 'CE' = 'continuing education'; 'IPR' = 'intellectual property rights'. Source: HE-BCI Part B Tables 1 and 2.

4. Figure 15 shows relative proportions of income by partner. The income from selected activities is roughly similar, although Scotland shows a higher proportion of income from both large business and SMEs than the other nations.
5. In Figure 16 the results are again broadly similar, although it can be seen that HEIs in Wales receive relatively more income from continuing professional development and less from facilities, while the reverse is seen for Northern Ireland.

Annex C: IP-related international comparisons

1. As in previous years we have compared the Higher Education – Business and Community Interaction (HE-BCI) survey data with the US Association of University Technology Managers (AUTM) Licensing Survey. Individualised institutional data is available for US universities from the AUTM's Statistics Access for Technology Transfer database and we have aggregated this data from 2014 in our comparisons.
2. We have also received data from the University Network for Innovation and Technology Transfer (UNITT) in Japan for 2014.
3. Comparing raw data may not be useful in itself because this does not consider the different size of higher education (HE) sectors in each country; any useful benchmark must take this factor into account. For this reason some form of scale normalisation is needed to allow a valid comparison. In previous HE-BCI survey reports we have used research income and expenditure as the most appropriate proxy for scale, because this information is available for institutions, and is clearly linked to the value of available resources. Benchmarking is also difficult because definitions used may vary between surveys.
4. Furthermore, UK data under HE-BCI are collected by an official body (the Higher Education Statistics Agency (HESA)), and undergo more comprehensive validation than those from the US and Japan, which are submitted to sector-representative bodies.
5. With these caveats in mind, the data suggests that the UK performs well when compared to both the USA and Japan. The UK produces similar numbers of spin-off companies per resource to the USA, and both produce substantially more than Japanese universities (despite the latter having a very high rate of patenting per resource).
6. US universities do produce relatively more licenses (referred to in the main body of this report as intellectual property (IP) income – arguably a more immediate form of knowledge exchange than spin-off companies) than the UK, although both are apparently far ahead of Japan. The UK receives the greatest proportion of research income from industry.
7. As noted above, further work to benchmark and normalise this data may be of use, for example adding European data when available, but the clear picture is of the UK being globally competitive in terms of commercialising knowledge.

Table A: Commercialisation activity in 2014-15 for the US and UK within HEPs

	US	UK	Japan
	AUTM	HE-BCI survey	UNITT
Total research resource (£M)	35,542	7,874	13,443
IP income including sales of shares in spin-offs (£M)	1,401	155	18.7
IP income as percentage of total research resource	3.90%	2.00%	0.10%
Spin-off companies formed	840	142	35
Research resource per spin-off (£M)	42.3	55.5	384.1
Patents granted	21,060	953	4,529
Research resource per patent (£M)	1.7	8.3	3.0
Industrial contribution (£M)	2,518	548	292
% industrial research	7.10%	7.00%	2.20%
US/Japan cashed-in equity/UK Sale of spin-off shares (£M)	54.9	55.8	1.7

Guide to Table A data

8. Some caution must be taken when comparing the sets of data, because the US AUTM, Japanese UNITT and UK HESA Finance/HE-BCI surveys are not identical, and use differing definitions and accounting periods because they have differing purposes and scope.

9. The total number of UK higher education institution (HEI) spin-off companies in Table A is derived from the HE-BCI survey, including those companies with some HEP ownership and those that use HE-generated IP as a basis for their operation.

10. UK HEPs are free to use their total block grant funds from funding councils for either teaching or research as they feel appropriate. Since full expenditure details for the block grant are not collected, it is assumed in this calculation that all of the research block grant funds and other research income are spent on research. The data is taken from HESA Finance Statistics Return 2014-15, Table 6b: Income analysed by source. This income is taken as the available resource for UK HEPs.

11. The number of start-up companies formed is divided by the total research resource. The start-up companies defined in the AUTM survey are those dependent on institutions' technology for initiation, and so are equivalent to those spin-off companies

recorded in the UK's HE-BCI surveys. Research expenditure is taken over the 2014 fiscal year and is taken as being the available resource for US universities.

12. The US AUTM survey allows for confidential returns; these have been excluded, as the impact of their exclusion is small and has a minimal impact on either the ratio figures of IP income as a percentage of research expenditure, or the spin-offs formed per £ million of research expenditure.

13. The UNITT survey loosely mirrors the AUTM process.

14. For the UK, HESA data on research income from industry, commerce and public corporations from UK and overseas sources is used to give the industrial contribution. For US and Japanese universities expenditure from industry is used.

15. Income from cashed-in equity is recorded in the AUTM and UNITT surveys and is assumed to be broadly equivalent to the income from the sale of shares in spin-off companies collected in the UK HE-BCI survey.

16. The exchange rate used is the annual average spot exchange rate for 2014-15 UK Academic Year (August to July) from the Bank of England: \$1.57 to £1 and ¥180.5 to £1.

17. For further information about the AUTM and Japanese UNITT surveys, see [www.autm.net/resources-surveys/research-reports-databases/statt-database-\(1\)/](http://www.autm.net/resources-surveys/research-reports-databases/statt-database-(1)/) and <http://unitt.jp/en>.

List of abbreviations

AUTM	Association of University Technology Managers (USA)
CE	Continuing education
CPD	Continuing professional development
ERDF	European Regional Development Fund
ESF	European Social Fund
GDP	Gross domestic product
HE	Higher education
HE-BCI	Higher Education – Business and Community Interaction survey
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
HEI	Higher education institution
HEIDI	Higher Education Information Database for Institutions
HEP	Higher education provider
HESA	Higher Education Statistics Agency
IP	Intellectual property
IPR	Intellectual property rights
KE	Knowledge exchange
RDA	Regional Development Agency
SFC	Scottish Funding Council
SME	Small or medium-sized enterprise
UNITT	University Network for Innovation and Technology Transfer (Japan)